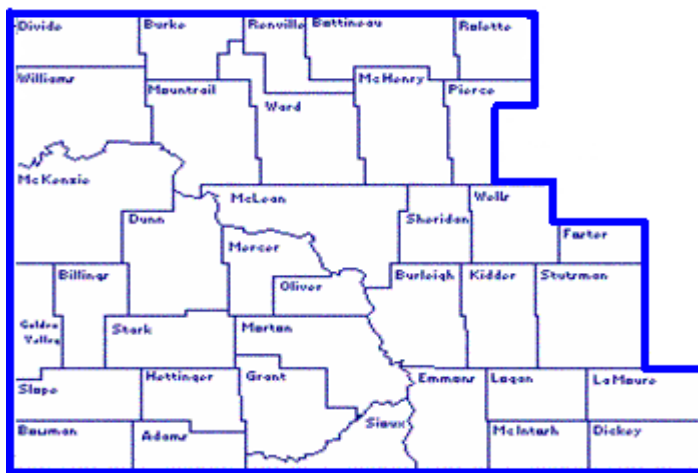


Fall  
2009

# *Dakota Skies*

## **Bismarck North Dakota National Weather Service**

A map of the Bismarck CWA (County Warning Area) or area of responsibility. We issue weather products such as warnings and forecasts for 36 counties in western and central North Dakota. The office has 23 employees of which 14 are meteorologists. We are also staffed with a hydrologist. Staffing is 24 hours a day, seven days a week, year round, serving you.



NOAA's NWS Bismarck web site at...  
**[www.weather.gov/bis](http://www.weather.gov/bis)**

## FALL 2009 TABLE OF CONTENTS

- **Page 1...Map of NWS Bismarck County Warning Area**
- **1...NOAA Logo**
- **1...NWS Bismarck Web Site Address**
- **2...Table of Contents**
- **2...Winter Weather Awareness Week**
- **2...About this Publication**
- **3...Winter Weather Terminology**
- **3...Wind Chill Table**
- **3...Be Prepared**
- **4...Winter 2009-2010 Outlook**
- **4...Detailed Map of Temperature Outlook**
- **4...Detailed Map of Precipitation Outlook**
- **5...Valuable Web Sites**
- **5...Don't Be Late...or Early**
- **5...Call 511 for Road Report Information**
- **5...Winter Officially Begins**
- **5...Spring Officially Begins**
- **5...Severe Summer Weather 2009 Review**
- **6...The Flooding of 2009**
- **7...The Dickinson Tornado of July 8**
- **7...NOAA Weather Radio-All Hazards**
- **8...SKYWARN Recognition Day 2009**

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## Preparation is key...do it now!

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### Winter Weather Awareness Week is November 2 through November 6

“Severe Winter Weather Awareness Week” in North Dakota is November 2 through November 6. You should...Get a Kit...Make a Plan...and Be Informed. Keep a high level of situational awareness by listening to the forecast every day. When snow, sleet, or freezing rain is in the forecast expect that it will impact your day to day routine, and be ready when it does!

Now is a good time to re-familiarize yourself with winter terms and safety rules. Prepare now for winter! (See page 3.)

## About this Publication

*Dakota Skies* is published twice each year, in the spring and in the fall, by the WCM (Warning Coordination Meteorologist) at your National Weather Service in Bismarck, North Dakota. Its purpose is to heighten awareness about safety for the coming severe weather season, whether it be summer or winter, and to relay information on any changes at the Bismarck NWS (National Weather Service). Additionally, other educational and useful information will be provided as space allows. If you have any comments or suggestions contact us.

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## Winter Weather Terminology

Watch is issued when the risk of a hazardous winter weather event has increased, but its occurrence, location, and/or timing is still uncertain.

Warning or Advisory is issued when a hazardous winter weather event is occurring, is imminent, or has a high probability of occurrence. A warning is used when there is a threat to life or property. An advisory is for less serious conditions that cause inconvenience, and, if caution is not used, could lead to situations that may threaten life or property.

Snow criteria for a warning is 6 inches or more in 12 hours or less, OR, 8 inches or more in 24 hours or less. Snow criteria for an advisory is 3 to 5 inches.

Winter Storm Warnings and Winter Weather Advisories may be issued for a combination of elements like snow coupled with wind and blowing snow, or snow coupled with sleet and freezing rain.

Sleet is pellets of ice. Sleet bounces when it hits the ground.

Freezing Rain is rain that freezes when it hits the ground or objects on the ground. It forms a sheet or glaze of ice.

Ice Storm is used to describe occasions when the ice from freezing rain is significant enough (1/4 inch thick or more) to cause damage.

Blizzard is a storm with winds of 35 mph or higher AND visibility frequently below 1/4 mile in snow and/or blowing snow AND these conditions last three (3) hours or longer. There is no set temperature requirement for a blizzard.

Wind Chill is that part of the cooling of a human body caused by moving air. Moving air accelerates the rate of heat transfer away from a human body.

Wind Chill Advisory is issued for wind chills of 20 to 40 below zero with a wind speed of at least 10 mph.

Wind Chill Warning is issued for wind chills lower than 40 below zero with a wind speed of at least 10 mph.

## wind chill table

wind speed down left side - temperature across top

	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

## Be Prepared

In the cold dress in layers of loose fitting clothes. Wear a hat, gloves or mittens, and a scarf. Have as little skin as possible exposed to the elements.

When shoveling snow go slow, take breaks, and don't get too tired. Keep fire hydrants near your home or business visible and free of snow.

Carry a winter survival kit in your vehicle. Include extra clothing, a blanket, and high energy food like candy bars, peanuts, and raisins. Have a flash light with fresh batteries, paper towels, sand, and a shovel. Keep the gas tank and windshield washer bottle full.

Before you set out on a trip let someone know the time you leave, the route you will take, and the time you plan to arrive. Check the latest forecast and road report. Take a cell phone and be sure the vehicle windows, headlights and taillights are clear of snow, ice, and frost.

If you get stuck, raise the vehicle antenna and tie a brightly colored cloth to it so that others passing by will see you. Keep the exhaust pipe clear of snow but do not overexert yourself by trying to push or shovel the vehicle out of deep snow. Keep a window open about a half inch. Clap your hands and rub your legs. Move your body around in the vehicle. Stay inside the vehicle. Do not try to walk away from the vehicle unless you can see a place of safety at a close distance. Do not fall asleep! Stay awake!

## Winter 2009-2010 Outlook

[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)

NOAA's CPC (Climate Prediction Center) 2009-2010 Winter Outlook issued October 15 calls for an enhanced chance for above average temperatures and near normal to slightly below average precipitation for North Dakota.

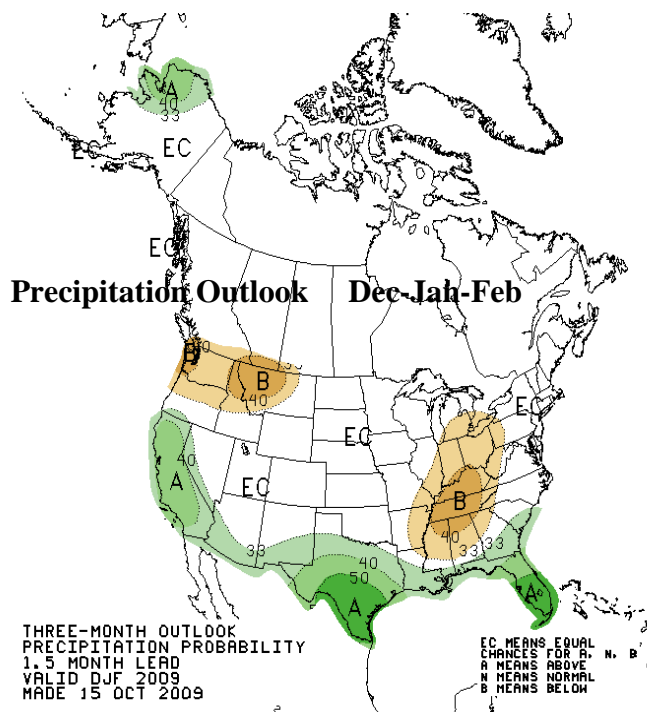
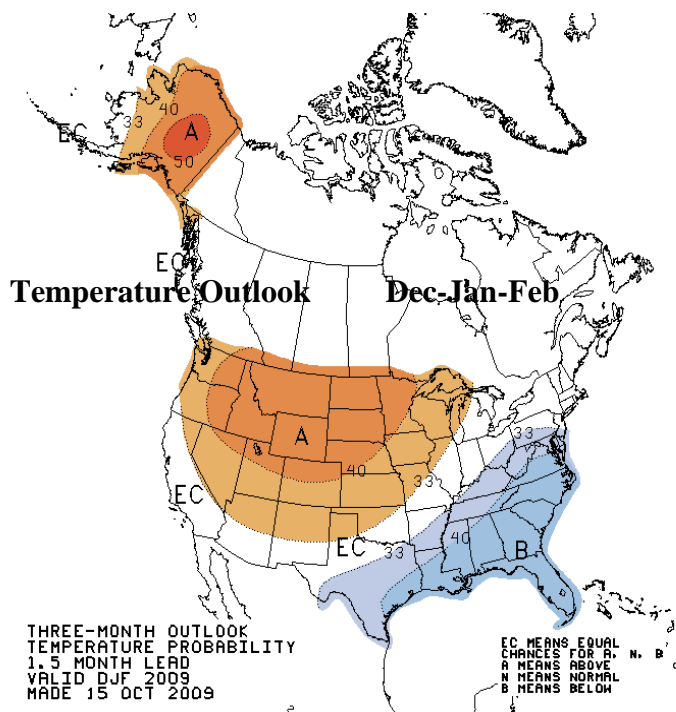
This CPC outlook is an average over the three month period called Meteorological Winter, namely December, January, and February. As always we need to be mindful that March and April can bring big storms through the state. Also, remember that although this long term forecast is firmly based on the science of meteorology, along with climatology factored in, as with any forecast it is subject to change.

Through the winter over western and central North Dakota average maximum (high) temperatures are in the 20s, and average minimum (low) temperatures are zero to 5 above. Snowfall during this period averages around 25 inches. These numbers are for December through February only. If we take the entire "snow" season, which usually starts in mid October and runs through April, average snowfall is around 50 inches.

This forecast is based, in part, on the expectation that the high phase of the El Nino Southern Oscillation (ENSO) occurring this fall will continue through the winter. This high phase of El Nino is characterized by warmer than normal eastern Pacific Ocean sea surface temperatures. These warmer than normal ocean temperatures affect the atmospheric pressure over the Pacific, which in turn alters the location of the jet stream, that river of air that steers storms. It is expected that the Polar Jet will be shifted farther to the north, placing North Dakota on the "warm side" of it more often during the winter months. However, historically in this pattern, the spring to follow, namely March, April, and May, are cooler and wetter than normal.

The autumn we are currently in has been wetter and cooler than normal over much of North Dakota. This is in line with what is expected to occur from the high phase of El Nino.

Finally, it is always important to keep in mind that these forecasts are meant to represent the whole winter season, not a day to day forecast. Tremendous day to day variability exists throughout the winter. As we all know, it would not be winter in North Dakota without a few big storms and some bitterly cold arctic outbreaks. There will be snowy days and cold days, just like every winter in North Dakota, it's just that they should be fewer and farther between this time around.



## Valuable Web Sites

NWS Bismarck at  
[www.weather.gov/bis](http://www.weather.gov/bis)

NWS Grand Forks at  
[www.weather.gov/fgf](http://www.weather.gov/fgf)

North Dakota Department of Emergency Services at  
[www.nd.gov/des](http://www.nd.gov/des)

North Dakota Department of Transportation at  
[www.dot.nd.gov](http://www.dot.nd.gov)

North Dakota Highway Patrol at  
[www.nd.gov/ndhp](http://www.nd.gov/ndhp)

North Dakota Game and Fish at  
[www.gf.nd.gov](http://www.gf.nd.gov)

North Dakota Parks & Recreation Department at  
[www.parkrec.nd.gov](http://www.parkrec.nd.gov)

North Dakota State Fire Marshal at  
[www.ag.state.nd.us/FM/FM.htm](http://www.ag.state.nd.us/FM/FM.htm)

Citizen Corps at  
[www.citizencorps.gov](http://www.citizencorps.gov)

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### Don't Be Late...or Early

Sunday, November 1, 2009...2 AM CDT becomes 1 AM CST. Fall BACK one hour.

Sunday, March 14, 2010...2 AM CST becomes 3 AM CDT. Spring AHEAD one hour.

The Energy Act of 2005 changed the time change dates for DST (Daylight Savings Time) in the United States. DST begins on the second Sunday of March and ends on the first Sunday of November.

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## Road Reports and other DOT information...dial **511**

<b>Winter Officially Begins at 11:47 AM CST on December 21, 2009</b>	<b>Spring Officially Begins at 12:32 PM CDT on March 20, 2010</b>
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### Severe Summer Weather 2009 Review

By definition a *severe thunderstorm* is one that produces a 58 mph (50 knot) wind gust and/or 1.00 inch diameter hail. A quarter is 1.00 inch diameter.

A *tornado* is a violently rotating column of air in contact with the ground (visible funnel not necessary).

A *Flash Flood* results from too much water in a short period of time where flooding occurs very quickly, or in a "flash".

The Enhanced Fujita (EF) tornado damage scale:

<u>EF-rating</u>	<u>tornado intensity</u>	<u>wind speed</u>
EF0	weak	65 to 85 (mph)
EF1	weak	86 to 110
EF2	strong	111 to 135
EF3	strong	136 to 165
EF4	violent	166 to 200
EF5	violent	201(+) mph

During the 2009 severe weather season the National Weather Service in Bismarck officially logged the following reports for the Bismarck CWA (County Warning Area) (see map page 1): (see page 6):

Note that the definition of a severe thunderstorm changed from 2008 to 2009 with respect to hail. Severe hail size changed from 0.75 inch diameter (penny size) to 1.00 inch diameter (quarter size).

60 large hail (1.00 inch diameter or larger) (compared to 149 in 2008 at 1.00 inch or larger)

63 high wind (58 mph or higher) (compared to 70 in 2008)

16 tornadoes (west and central North Dakota only) (compared to 19 in 2008)

9 flash floods (compared to 4 in 2008)

The first report of severe summer weather in 2009 was a 60 mph wind gust from a thunderstorm at the Minot Air Force Base on March 22, an early start.

The largest hail stone was 4.25 inches in diameter. It fell in northern Bowman County on September 7.

The highest wind gusts from thunderstorms were around 80 mph around Dickinson on July 8. They were produced by the same storm that caused the tornado in Dickinson that same evening.

**See “The Dickinson Tornado of July 8, 2009” on page 7.**

## **The Flooding of 2009**

West and central North Dakota experienced a snowy winter of 2008-2009 with most areas receiving two to three times the normal snowfall. This set the stage for devastating flooding.

A warm up over the southwest early in March resulted in flooding there. Much more significant and widespread warming came toward the middle of March. It occurred ahead of a storm that brought thunderstorms and heavy rain that resulted in rapid snow melt and ice jams, followed by heavy snow and a blizzard.

For most areas the flooding, some of it river and stream related and some overland flooding away from rivers and streams, was the worst in a dozen years, rivaling and in some cases surpassing that following the winter of 1996-1997. For a few places it was the worst flooding ever. Ice jams, which occur most springs in North Dakota, were more numerous and severe than what would be considered normal.

Losses were tremendous with hundreds of homes flooded, some completely destroyed, and many roads and some bridges washed out. County and township roads, already damaged by the winter plowing of snow, suffered more damage by the flooding. Sections of major state highways were closed due to flooding, including parts of Interstate 94.

Agriculture was hard hit. It has been estimated that because of the flooding around 1.7 million acres would not be planted in 2009. Using an average value of \$300 an acre, that amounts to a potential loss through non planting of around \$490 million. The ranching industry was also hard hit. It has been estimated that the harsh winter, including blizzards, and the flooding, resulted in 78,000 calves being killed, along with 19,100 cows, 180 horses, and 3,000 other farm and ranch animals. It was estimated that this number of beef cows, had they lived to slaughter, could have fed 800,000 people for one year. The cost loss would be around \$50 million. Economic impact to society, impact on communities, uses a multiplier of four to seven times the loss, so \$200 million to \$350 million.

## **.The Dickinson Tornado of July 8, 2009**

Meteorologists from the National Weather Service conducted a storm damage survey in and around Dickinson on Thursday, July 9th, 2009. Meteorologists walked through the area and spoke with numerous people affected, many of whom were eye witnesses to the event.

This tornado (evening of July 8) passed through the city of Dickinson on the far south side, mainly just south of the Heart River. No witnesses spoken to actually saw the tornado. From their eye witness accounts, and from video obtained by the Dickinson Police Department, it is likely that this was a rain-wrapped tornado, and very difficult if not impossible to see. The tornado occurred before sunset, yet it was described as being as dark as night during the event.

The conclusion of the damage survey was that this tornado touched down around a mile or so outside the city limits, on the southwest side, and moved east-northeast, passing through the far southern part of the city. It lifted back into the parent thunderstorm on the extreme southeast side of Dickinson near the city limit. This occurred in the window between 815 PM MDT and 830 PM MDT.

Over 450 structures were damaged, of which nearly 100 were declared completely destroyed or beyond repair. Numerous vehicles were damaged or destroyed, some were on their roofs. Power lines were snapped, knocking out power to most of Dickinson, and tree damage was extensive. Two minor injuries were reported, with no deaths. The injuries were to a 23 year old male and a 42 year old male. Both occurred in homes. The worst damage surveyed was between the Heart River and roughly 8th Street Southwest and 8th Street Southeast in southern Dickinson. Of that damage, the absolute worst corresponded to middle EF3 on the Enhanced Fujita Tornado Scale. From that it was determined that peak wind speeds in the tornado were on the order of 150 mph.

Other parts of Dickinson and the surrounding area sustained wind damage likely associated with the rear flank downdraft of the storm.

Dollar value damage estimates were around \$20 million.



### **Western and central North Dakota NOAA Weather Radio All Hazards Stations**

Bismarck 162.475 MHz	Dickinson 162.400	Jamestown 162.550	Kidder County 162.400
Minot 162.400	New Town 162.525	Rolla 162.475	Scranton 162.525
Williston 162.550	Willow City 162.450		

Also serving parts of west and central North Dakota...

Baker MT 162.550	Bath SD 162.475	Firesteel SD 162.425	Ft Ransom ND 162.525
Lowry / Mobridge SD 162.500		Sheyenne ND 162.525	



### **SKYWARN Recognition Day 2009**

SRD (SKYWARN Recognition Day) for 2009 has been set for December 5. It will run from 0000 UTC (Universal Coordinated Time) to 2400 UTC. That corresponds to 6 PM CST on December 4, to 6 PM CST on December 5. This will be the 11th annual SRD.

SKYWARN is a national network of severe weather spotters. It is basically volunteers, who are trained in severe weather observing, and report information to the National Weather Service. In this way the spotters become a critical component of the Warning and Decision making process that goes on at the NWS. SKYWARN really is one neighbor helping another in the protection of life and property.

SKYWARN Recognition Day celebrates the contributions that amateur radio operators make to the National Weather Service severe weather operations, and consequently to the public welfare.

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## **U.S. Department of Commerce**

### **National Oceanic and Atmospheric Administration**

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